SUMMARY STATEMENT

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TITLE OF PROJECT - Embryonic Gene Activation in Bronchogenic Cancer

The basic premise of this multidisciplinary three year program is that a fundamental manifestation of neoplasia is the activation of embryonic, placental and fetal genes. The questions which arise from this premise are (1) to what extent is bronchogenic carcinoma associated with the activation of embryonic genes with respect to four typical carcinoembryonic proteins? (2) Does the individual histologic type of bronchogenic cancer [squamous cell carcinoma, small cell carcinoma, adenocarcinoma, large cell anaplastic carcinoma, mixed tumors] and its degree of differentiation correlate with one or a combination of carcinoembryonic proteins - in the primary lesion? in the metastasis? (3) Do carcinoembryonic proteins appear in the bronchial epithelium of individuals destined to develop bronchogenic carcinoma as studied in metaplastic and in situ carcinoma tissue? (4) Is there a correlation between the smoking and drinking histories of patients and the activation of embryonic genes?

We are in a position to approach these questions experimentally because we have had extensive experience with the Regan isoenzyme [a placental alkaline phosphatase first found in a patient (Peter Regan) with metastatic cancer of the lung] and we have been developing new knowledge through the study of cancer cell phenotypes produced in ovarian cancer, which is the first type of cancer we have been studying.

Cancer of the lung would become the second type of cancer to which the Tufts Cancer Research Center with its basic scientists and clinicians is prepared to commit itself. The funds requested will be the sole initial support of this effort and will make possible not only the radioimmunoassay capability for carcinoembryonic proteins and the participation of the Pondville investigators and their resources but will also provide a forward impetus to the entire research program of the Center.

Attention will be focused on the epithelial elements of the human lung, the recognition and evaluation in the epithelium of embryonic gene expression, the possibility of finding correlations of such findings with either susceptibility or potential for neoplastic progression.

The embryonic proteins include Regan isoenzyme, human chorionic gonadotrophin, CEA and α-fetoprotein which can be determined quantitatively by radioimmunoassay. In addition, we may soon be in a position to demonstrate these proteins cytologically at the level of both the light and electron microscopes. This would enable us to make more precise interpretations of the quantitative values.

With the professional and patient resources at the Pondville Hospital together with the expertise of the scientists in the laboratories of the Tufts Cancer Research Center, the commitment is to research of high objective quality in a multidisciplinary effort. A balance will be maintained between qualitative studies of biologic phenomena and subsequent quantitative evaluations.